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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/615,941	07/10/2003	Kazuki Takemoto	03560.003339	1080

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EXAMINER	
BRIER, JEFFERY A	

ART UNIT	PAPER NUMBER
2628	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/615,941	TAKEMOTO ET AL.	
	Examiner	Art Unit	
	Jeffery A. Brier	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 5-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 5-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/27/2007 has been entered.

Response to Amendment

2. The amendment filed on 1/30/2007 has been entered.

The amendment filed 1/30/2007 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the changes made to paragraph [0006] enters new matter because the "object" is not clearly limited to the stylus discussed at paragraph [0028].

Applicant is required to cancel the new matter in the reply to this Office Action.

Information Disclosure Statement

3. The translation of the Hirokazu Kato, Mark Billinghurst, Koichi Asano, and Keihachiro Tachibana article titled An Augmented Reality System and its Calibration based on Marker Tracking filed on 3/28/2007 has been considered and the article submitted on 1/30/2007 is cited on the attached PTO-892.

Response to Arguments

4. Applicant's arguments filed 1/30/2007 have been fully considered but they are not persuasive. In the paragraph spanning pages 11 and 12 applicant makes reference to applicants specification at paragraph [0005] and argues that applicant creates the constraining shape dynamically in accordance with the user's instruction when said user operates the virtual image. Applicant in the sentence which spans pages 12 and 13 states the Kitamura discloses that the constraining shape as constraint condition is calculated base on the geometric model of the object, which is kept in advance, and does not even suggest creating the constraining shape in accordance with the instruction of a user who manipulates the virtual object, as shown in the present invention. However, claim 10 does not claim dynamically creating the constraining shape. In view of page 135 first paragraph under the heading of 5 Consolidated Manipulation Environment of Kitamura the same 6 DOF tracker is used to control the virtual object and to control the position of the constraining real objects which is similar to applicants system where stylus 1060 is used to control the virtual objects and to control the location of the constraining objects, see applicants paragraphs [0028], [0030], and [0041]. Therefore, Kitamura still anticipates the claims and if the claims were amended to claim the argued dynamic aspect then Kitamura's statement at page 135 first paragraph under heading 5 "The user employs a six degrees of freedom (DOF) tracker device to manipulate virtual objects. The shapes of the real objects are assumed to be know in advance, and the motion of the real objects is also obtained by the 6 DOF tracker." would still anticipate a claim to dynamically changing a constraining

object's location which would dynamically change the entire constraining shape formed by the sum of the constraining shapes. Currently amended claim 10 claims "obtaining a constraining shape based on the obtained three-dimensional position information" and in view of the word "obtaining" this claim limitation is met by moving for example the cubes of figure 2 to different locations to form a constraining shape of the cubes different than before the cubes were moved. Applicant needs to be more specific about how the constraining shape is obtained. Currently amended independent claims 1, 5, and 16 do not overcome the Kitamura article for similar reasons.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 1-3, 5-9, and 16-18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The amendment to independent claims 1, 5, and 16 "input three-dimensional position information of a plurality of positions inputted by moving a real object in the real space by a user" is not conveyed by the originally field disclosure because an object is different than the stylus discussed at paragraph [0028] that would be moved by the user. Currently applicant is claiming to

move any real object while the application only supports moving stylus 1060. Figures 2, 10, and 12-14 shows stylus 1060 but do not convey that any real object may be moved to input three-dimensional position information.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-3 and 5-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshifumi Kitamura and Fumio Kishino, Consolidated Manipulation of Virtual and Real Objects, September 1997, Proceedings of the ACM symposium on Virtual reality software and technology, pages 133-138. Kitamura teaches an augmented reality system that uses object constraints to control the visual interaction between the virtual objects and the real objects.

A detailed analysis of the claims follows.

Claim 10:

Kitamura teaches an information processing method for changing the position and orientation of a virtual object in mixed reality space obtained by combining a real space and a virtual space, said method comprising the steps of:

obtaining three dimensional position information of a plurality of positions designated by an operating unit moved by a user in the real space (*In view of page 135 first paragraph under the heading of 5 Consolidated Manipulation Environment of Kitamura the same 6 DOF tracker is used to control the virtual object and to control the position of the constraining real objects which is similar to applicants system where stylus 1060 is used to control the virtual objects and to control the location of the constraining objects, see applicants paragraphs [0028], [0030], and [0041]. The 6 DOF has a stylus the user moves which meets the operating unit moved by a user in the real space claim limitation.*);

obtaining a constraining shape based on the obtained three-dimensional position information (*This claim limitation is met by moving for example the cubes of figure 2 to different locations to form a constraining shape of the cubes different than before the cubes were moved. Applicant needs to be more specific about how the constraining shape is obtained.*);

changing the position and orientation of the virtual object according to instructions from the user, based on the obtained constraining shape as constraint condition (*The first paragraph in section 5 on page 135 describes the user using a 6 DOF tracker device to manipulate the virtual objects. The shape of the real objects are used to constrain the movement of the virtual object by giving the real object a shape that the virtual object interacts with in a constrained manner. Sections 5.1 to 5.4 discusses manipulation of the virtual object based upon constraint conditions based on the shape of the real object. The shape generated from the external instructions*

constraints the interaction of the virtual object with the real object, see sections 5.1 to 5.4.); and

combining an image of the virtual object generated according to the changed position and orientation, and the real image (*The introduction on page 133 second full paragraph discusses augmented reality which synthesizes a virtual object with a real object. The claim does not limit the form of the real image, thus, Kitamura teaches this limitation. Section 5.1 discusses after movement is detected by the 6DOF manipulator the virtual object is moved according to the constraints.*).

Claim 11:

Kitamura teaches an information processing method according to Claim 10, further comprising the step of combining a virtual image indicating the constraining shape with the real image (*The introduction on page 133 second full paragraph discusses augmented reality which synthesizes a virtual object with a real object. The claim does not limit the form of the real image, thus, Kitamura teaches this limitation. Section 5.1 discusses after movement is detected by the 6DOF manipulator the virtual object is moved according to the constraints.*).

Claim 12:

Kitamura teaches an information processing method according to Claim 10, wherein the constraining shape is a plane. (*On page 136 in the text above figure 2 determining a plane and using the plane to constrain movement of the virtual object is discussed with regards to figure 2.*).

Claim 13:

Kitamura teaches an information processing method according to Claim 10, wherein said changing step changing the position and orientation of the virtual object is carried out by changing the position and orientation of the operating unit (*The 6 DOF tracker is an operating unit. The user using the 6 DOF tracker device manipulates the virtual objects.*).

Claim 14:

Kitamura teaches a computer program product comprising a computer readable medium storing computer program code for performing the information processing method according to Claim 10 wherein the information processing method is executed by a computer device (*This article is directed to computers that generate the augmented reality scene since it was published by ACM for a symposium on virtual reality software and technology and since at page 133 in the last sentence in the second paragraph of section 1 software/hardware is discussed. Software causing a computer to perform Kitamura's augmented reality is inherently stored in a computer readable recording medium.*).

Claim 15:

Kitamura teaches a computer-readable recording medium, storing the computer program according to Claim 14 (*Software causing a computer to perform Kitamura's augmented reality is inherently stored in a computer readable recording medium.*).

Claim 16:

The functions of Kitamura corresponds to the claimed units because the software causes the computer to become a unit that performs a process. As seen below Kitamura performs the claimed processes.

Kitamura teaches an information processing device for aiding control operations relating to controlling the position and orientation of a virtual object, said device comprising:

an image capturing unit configured to capture a real image in real space (*The measurements by the user in three dimensional real space, the device for obtaining the 3-D shape by using a range image, and the device for obtaining the 3-D shape by using multiple cameras captures a real image in real space. The three paragraphs found in section 2 on page 134 of Kitamura teaches the user measuring the real objects, a device measuring the real objects with range in response to the user, or a device measuring the real objects with multiple cameras range in response to the user. The claim does not limit the form of the real image, thus, Kitamura teaches this limitation.*);

a virtual image generation unit configured to generate a virtual image of a virtual object according to the position and orientation of said image capturing unit (*Kitamura discusses in section 2 in the first paragraph using conventional modeling software after precisely measuring the size or length of the real object by hand or by the devices which is an generation unit capable of generating three-dimensional positional information.*) ;

a superimposing unit configured to superimpose the generated virtual image with the captured real image (*Section 2 discusses mixing the virtual and real world objects.*);

an inputting unit configured to input three-dimensional position information of a plurality of positions inputted by a moving a real object in the real space by a user (*In view of page 135 first paragraph under the heading of 5 Consolidated Manipulation Environment of Kitamura the same 6 DOF tracker is used to control the virtual object and to control the position of the constraining real objects which is similar to applicants system where stylus 1060 is used to control the virtual objects and to control the location of the constraining objects, see applicants paragraphs [0028], [0030], and [0041]. The 6 DOF has a stylus the user moves which meets the moving a real object limitation in the real space by a user claim limitation. Similarly using the 6 DOF to sense the new location of a moved real constraining object by the user meets the moving a real object limitation in the real space by a user claim limitation.*);

a setting unit configured to set a constraining shape based on the inputting three-dimensional position information (*The first paragraph in section 5 on page 135 describes the user using a 6 DOF tracker device to manipulate the virtual objects. The shape of the real objects are used to constrain the movement of the virtual object by giving the real object a shape that the virtual object interacts with in a constrained manner.*) ; and

an operating unit configured to control the position and orientation of the virtual object based on the constraining shape in accordance with the a user's instruction.(*Sections 5.1 to 5.4 discusses manipulation of the virtual object based upon constraint conditions based on the shape of the real object. The shape generated from the external instructions constrains the interaction of the virtual object with the real object, see sections 5.1 to 5.4. The introduction on page 133 second full paragraph discusses*

augmented reality which synthesizes a virtual object with a real object. Section 5.1 discusses after movement is detected by the 6DOF manipulator the virtual object is moved according to the constraints.).

Claim 17:

Kitamura teaches an information processing device according to Claim 16, wherein the constraining shape is defined by polygons (*Figure 2's Cubes are formed with polygons.*) and the apexes of the polygons are at positions inputted by the user (*According to section 5 the when the real objects are moved the 6DOF senses the new locations which requires for a cube the apex's position to be inputted by the user.*) or the constraining shape is a plane passing through the positions inputted by the user (*A real sensed surface is a planar real world object whose position is inputted by the user. The claim does not claim how or when the plane's position is inputted by the user.*).

Claim 18:

Kitamura teaches an information processing device according to Claim 16, wherein said operating unit performs at least one of the following operations in performing an operation controlling the position and orientation of the virtual object:

a translation operation for causing translational movement of the virtual object based on the constraining shape (*Page 137 column 1 lines 1-3 teaches translation when the virtual object collides with the real surface.*); or

a rotation operation for rotating the virtual object on an axis which is a normal vector at a plane where the constraining shape and the virtual object come into contact (*Page 137 column 1 lines 1-3 teaches rotation when the virtual object collides with the*

real surface.) (*Page 137 column 1 lines 1-3 also teaches translation and rotation when the virtual object collides with the real surface*).

Claims 1-3:

Means plus function claims 1-3 correspond to device claims 16-18 and the means of Kitamura, software and computer, are equivalent to applicant's means of software and computer.

Claims 5-7:

Step for claims 5-7 correspond to device claims 16-18 and the steps of Kitamura, software and computer, are equivalent to applicant's steps performed by software and computer.

Claims 8 and 9:

Claims 8 and 9 mirror claims 14 and 15 addressed above and they are rejected for the same reasons given above for claims 14 and 15.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffery A Brier whose telephone number is (571) 272-7656. The examiner can normally be reached on M-F from 7:30 to 4:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi, can be reached at (571) 272-7664. The fax phone Number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jeffery A Brier
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